IV. Problemas diversos

1. Si

$$A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 4 \\ 6 & 1 \end{bmatrix} \quad C = \begin{bmatrix} -1 & -2 \\ 3 & 6 \end{bmatrix}$$

Calcular $A(B+C)$ y $AB + AC$

Resolviendo por $A\underbrace{(B+C)}$ — Resolveremos primero

Resolviendo $B+C$

$$B+C = \begin{bmatrix} 2 & 4 \\ 6 & 1 \end{bmatrix} + \begin{bmatrix} -1 & -2 \\ 3 & 6 \end{bmatrix}$$

$$B+C = \begin{bmatrix} 2+(-1) & 4+(-2) \\ 6+3 & 1+6 \end{bmatrix}$$

$$B+C = \begin{bmatrix} 1 & 2 \\ 9 & 7 \end{bmatrix}$$

Ahora podemos hacer la multiplicación $A(B+C)$

$$\begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 9 & 7 \end{bmatrix}$$

X \ W	1	2
2 −1	T11	T12
3 4	T21	T22

$T_{11} = (2)(1) + (-1)(9)$

$T_{11} = 2 - 9$

$T_{11} = -7$

Sean X" W" Variables cualquiera

$T_{12} = (2)(2) + (-1)(7)$

$T_{12} = 4 - 7$

$T_{12} = -3$

$T_{21} = (3)(1) + (4)(9)$ (2)

$T_{21} = 3 + 36$

$T_{21} = 39$

$T_{22} = (3)(2) + (4)(7)$

$T_{22} = 6 + 28$

$T_{22} = 34$

obtenemos

$$A(B+C) = \begin{bmatrix} 7 & -3 \\ 39 & 34 \end{bmatrix}$$

Resolviendo por $A(B+C) = \underbrace{AB}_{\text{Resol.}} + \cancel{AC}$

Resolviendo $AB = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 2 & 4 \\ 6 & 1 \end{bmatrix}$

A \ B	2	4
	6	1
2 −1	C_{11}	C_{12}
3 4	C_{21}	C_{22}

$C_{11} = (2)(2) + (-1)(6)$

$C_{11} = 4 - 6$

$C_{11} = -2$

$C_{12} = (2)(4) + (-1)(1)$

$C_{12} = 8 - 1$

$C_{12} = 7$

$C_{21} = (3)(2) + (4)(6)$

$C_{21} = 6 + 24$

$C_{21} = 30$

$C_{22} = (3)(4) + (4)(1)$

$C_{22} = 12 + 4$

$C_{22} = 16$

(3)

$\therefore AB = \begin{bmatrix} -2 & 7 \\ 30 & 16 \end{bmatrix}$

Resolviendo para obtener ~~CA~~

	A	2	−1
C		3	4
−1	−2	W_{11}	W_{12}
3	6	W_{21}	W_{22}

$W_{11} = (-1)(2) + (-2)(3)$

$W_{11} = -2 - 6$

$W_{11} = -8$

$W_{12} = (-1)(-1) + (-2)(4)$

$W_{12} = 1 - 8$

$W_{12} = -7$

$W_{21} = (3)(2) + (6)(3)$

$= 6 + 18$

$= 24$

$W_{22} = (3)(-1) + (6)(4)$

$W_{22} = -3 + 24$

$W_{22} = 21$

$\therefore CA = \begin{bmatrix} -8 & -7 \\ 24 & 21 \end{bmatrix}$

$AB + CA = \begin{bmatrix} -2 & 7 \\ 30 & 16 \end{bmatrix} + \begin{bmatrix} -8 & -7 \\ 24 & 21 \end{bmatrix}$

$\begin{bmatrix} a & c & b \end{bmatrix} - \begin{bmatrix} 4 & 5 & 5 \end{bmatrix}$

Resolviendo para AC

A \ C	-1	-2
2	w_{11}	w_{12}
3	w_{21}	w_{22}

$w_{11} = (2)(-1) + (-1)(3)$
$w_{11} = -2-3$
$w_{11} = -5$

$w_{12} = (2)(-2) + (-1)(6)$
$= -4 - 6$
$= -10$

$w_{21} = (3)(-1) + (4)(3)$
$= -3 + 12$
$= 9$

$w_{22} = (3)(-2) + (4)(6)$
$w_{22} = -6 + 24$
$w_{22} = 18$

$$AC = \begin{bmatrix} -5 & -10 \\ 9 & 18 \end{bmatrix}$$

Retornamos ... AB+AC

$$AB+AC = \begin{bmatrix} -2 & 7 \\ 30 & 16 \end{bmatrix} + \begin{bmatrix} -5 & -10 \\ 9 & 18 \end{bmatrix}$$

$$AB+AC = \begin{bmatrix} -7 & -3 \\ 39 & 34 \end{bmatrix}$$